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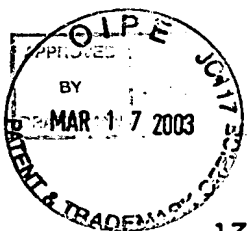
MAR 21 2003

TECH CENTER 1600/2900

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151 TTGGGGGTAT CGCTACAGGC ACCGCTGTAG GAACGGTCTC AGGGCTTCTT
201 AGCTGGGGGC TCAAACAAGC CGAAGAAGCC AATAAAACCC CAGATAAACC
251 CGATAAAGTT TGGCGCATTC AAGCAGGAAA AGGCTTTAAT GAATTCCCTA
301 ACAAGGAATA CGACTTATAC AGATCCCTTT TATCCAGTAA GATTGATGGA
351 GGTTGGGATT GGGGGAATGC CGCTAGGCAT TATTGGGTCA AAGGCGGGCA
401 ACAGAATAAG CTTGAAGTGG ATATGAAAGA CGCTGTAGGG ACTTATACCT
451 TATCAGGGCT TAGAACTTT ACTGGTGGGG ATTTAGATGT CAATATGCAA
501 AAAGCCACTT TACGCTTGGG CCAATTCAAT GGCAATTCTT TTACAAGCTA
551 TAAGGATAGT GCTGATCGCA CCACGAGAGT GATTTCAACG CTAAAAATAT
601 CTCAATTGAT AATTTTGAG AAATCAACAA CTCGTGTGGG TTCTGGAGCC
651 GGGAGGAAAG CCAGCTCTAC GGTTTTGACT TTGCAAGCTT CAGAAGGGAT
701 CACTAGCGAT AAAACGCTG AAATTTCTCT TTATGATGGT GCCACGCTCA
751 ATTTGGCTTC AAGCAGCGTT AAATTAATGG GTAATGTGTG GATGGGCCGT
801 TTGCAATACG TGGGAGCGTA TTTGGCCCCT TCATACAGCA CGATAAACAC
851 TTCAAAAGTA ACAGGGGAAG TGAATTTTAA CCACCTCACT GTTGGCGATA
901 AAAACGCCGC TCAAGCGGGC ATTATCGCTA ATAAAAAGAC TAATATTGGC
951 AACTGGATT TGTGGCAAAG CGCCGGGTTA AACATTATCG CTCCTCCAGA
1001 AGGTGGCTAT AAGGATAAAC CCAATAATAC CCCTTCTCAA AGTGGTGCTA
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1101 AATAATAGTA AACTCAGGT CATTAACCCA CCAATAGTG CGCAAAAAAC
1151 AGAAGTTCAA CCCACGCAAG TCATTGATGG GCCTTTTGCG GCGGCAAAG
1201 ACACGGTTGT CAATATCAAC CGCATCAACA CTAACGCTGA TGGCAGGATT
1251 AGAGTGGGAG GGTTTAAAGC TTCTCTTACC ACCAATGCGG CTCATTTGCA
1301 TATCGGCAAA GCGGTGTCA ATCTGTCCAA TCAAGCGAGC GGGCGCTCTC

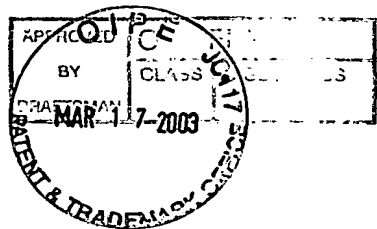
FIG. 1A



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1351 TTATAGTGGA AAATCTAACT GGAATATCA CCGTTGATGG GCCTTTAAGA
1401 GTGAATAATC AAGTGGGTGG CTATGCTTTG GCAGGATCAA GCGCGAATTT
1451 TGAGTTTAAG GCTGGTACGG ATACCAAAAA CGGCACAGCC ACTTTTAATA
1501 ACGATATTAG TCTGGGAAGA TTTGTGAATT TAAAGGTGGA TGCTCATACA
1551 GCTAATTTTA AAGGTATTGA TACGGGTAAT GGTGGTTTCA ACACCTTAGA
1601 TTTTAGTGGC GTTACAGACA AAGTCAATAT CAACAAGCTC ATTACGGCTT
1651 CCACTAATGT GGCCGTAAA AACTTCAACA TTAATGAATT GATTGTAAA
1701 ACCAATGGGA TAAGTGTGGG GGAATATACT CATTTTAGCG AAGATATAGG
1751 CAGTCAATCG CGCATCAATA CCGTGC GTTT GGAAACTGGC ACTAGGTCAC
1801 TTTTCTCTGG GGGTGTAAA TTTAAAGGTG GCGAAAAAT GGTATAGAT
1851 GAGTTTTACT ATAGCCCTTG GAATTATTTT GACGCTAGAA ATATTAAAA
1901 TGTTGAAATC ACCAATAAAC TTGCTTTTGG ACCTCAAGGA AGTCCTTGGG
1951 GCACATCAAA ACTTATGTTT AATAATCTAA CCCTAGGTCA AAATGCGGTC
2001 ATGGATTATA GCCAATTTTT AAATTTAACC ATTCAAGGGG ATTTTCATCA
2051 CAATCAAGGC ACTATCAACT ATCTGGTCCG AGGTGGGAAA GTGGCAACCT
2101 TAAGCGTAGG CAATGCAGCA GCTATGATGT TTAATAATGA TATAGACAGC
2151 GCGACCGGAT TTTACAAACC GCTCATCAAG ATTAACAGCG CTCAAGATCT
2201 CATTAAAAAT ACAGAACATG TTTTATTGAA AGCGAAAATC ATTGGTTATG
2251 GTAATGTTTC TACAGGTACC AATGGCATTG GTAATGTAA TCTAGAAGAG
2301 CAATTCAAAG AGCGCCTAGC CCTTTATAAC AACAATAACC GCATGGATAC
2351 TTGTGTGGTG CGAAATACTG ATGACATTAA AGCATGCGGT ATGGCTATCG
2401 GCGATCAAAG CATGGTGAAC AACCTGACA ATTACAAGTA TCTTATCGGT
2451 AAGGCATGGA AAAATATAGG GATCAGCAA ACAGCTAATG GCTCTAAAAT
2501 TTCGGTGTAT TATTTAGGCA ATTCTACGCC TACTGAGAAT GGTGGCAATA
2551 CCACAAATTT ACCCACAAC AGCACTAGCA ATGCACGTTC TGCCAACAAC
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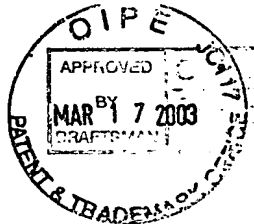
FIG. 1B



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2701 TGGCTAACCG CTCTAAAGAT ATTGACACGC TTTATGCTAA CTCAGGCGCT
2751 CAAGGCAGGG ATCTCTTACA AACCTTATTG ATTGATAGCC ATGATGCGGG
2801 TTATGCCAGA AAAATGATTG ATGCTACAAG CGCTAATGAA ATCACCAAGC
2851 AATTGAATAC GGCCACTACC ACTTTAAACA ACATAGCCAG TTTAGAGCAT
2901 AAAACCAGCG GCTTACAAAC TTTGAGCTTG AGTAATGCGA TGATTTTAAA
2951 TTCTCGTTTA GTCAATCTCT CCAGGAGACA CACCAACCAT ATTGACTCGT
3001 TCGCCAAACG CTTACAAGCT TTAAGAGACC AAAAATTCGC TTCTTTAGAA
3051 AGCGCGGCAG AAGTGTTGTA TCAATTTGCC CCTAAATATG AAAAACCTAC
3101 CAATGTTTGG GCTAACGCTA TTGGGGGAAC GAGCTTGAAT AATGGCTCTA
3151 ACGCTTCATT GTATGGCACA AGCGCGGGCG TAGACGCTTA CCTTAACGGG
3201 CAAGTGGAAG CCATTGTGGG CGGTTTTGGA AGCTATGGTT ATAGCTCTTT
3251 TAATAATCGT GCGAACTCCC TTAAGCTCTGG GGCCAATAAC ACTAATTTTG
3301 GCGTGTATAG CCGTATTTTA ACCAACCAGC ATGAATTTGA CTTTGAAGCT
3351 CAAGGGGCAC TAGGGAGCGA TCAATCAAGC TTGAATTTCA AAAGCGCTCT
3401 ATTACAAGAT TTGAATCAAA GCTATCATT CTTAGCCTAT AGCGCTGCAA
3451 CAAGAGCGAG CTATGGTTAT GACTTCGCGT TTTTATAGGAA CGCTTTAGTG
3501 TTAAACCAA GCGTGGGTGT GAGCTATAAC CATTAGGTT CAACCAACTT
3551 TAAAGCAAC AGCACCAATC AAGTGGCTTT GAAAAATGGC TCTAGCAGTC
3601 AGCATTTATT CAACGCTAGC GCTAATGTGG AAGCGCGCTA TTATTATGGG
3651 GACACTTCAT ACTTCTACAT GAATGCTGGA GTTTTACAAG AGTTCGCTCA
3701 TGTTGGCTCT AATAACGCCG CGTCTTTAAA CACCTTTAAA GTGAATGCCG
3751 CTCGCAACCC TTAAATACC CATGCCAGAG TGATGATGGG TGGGGAATTA
3801 AAATTAGCTA AAGAAGTGTT TTTGAATTTG GCGTGTGTTT ATTTGCACAA
3851 TTTGATTTC AATATAGGCC ATTCGCTTC CAATTTAGGA ATGAGGTATA
3901 GTTTCTAAAT ACCGCTCTTA AACCCATGCT CAAAGCATGG GTTTGAAATC
3951 TTACAAAACA

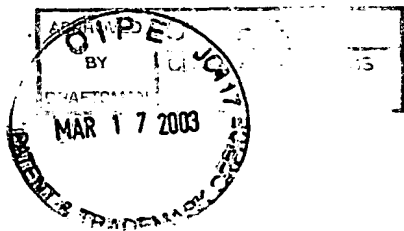
FIG. 1C



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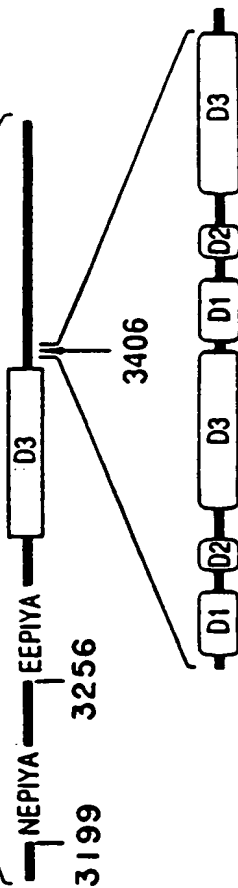
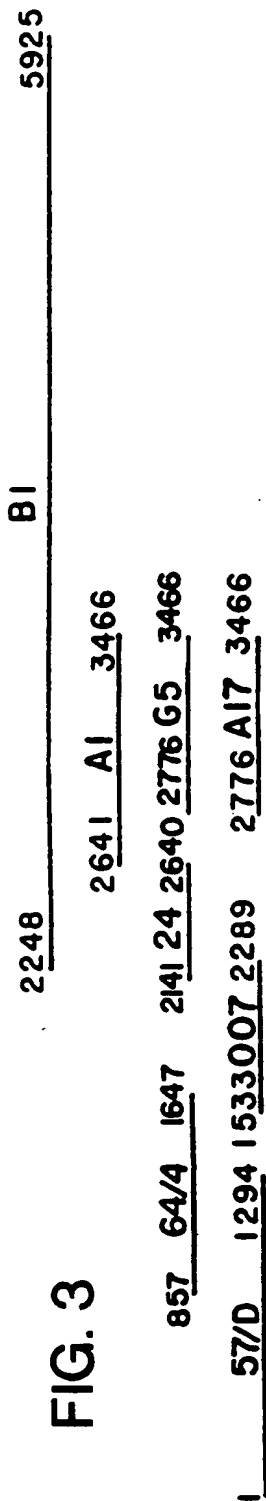
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51 GTAVGTVSGL LSWGLKQAE E ANKTPDKPKD VWRIQAGKGF NEFPNKEYDL
101 YRSLSSKID GGWDWGNAAR HYWVKGGQQN KLEVDMKDAV GTYTL SGLRN
151 FTGGDL DVNM QKATLRLGQF NGNSFTSYKD SADRTRVIS TLKISQLIIL
201 QKSTTRVGS G AGRKASSTVL TLQASEGITS DKNAEISLYD GATLN LASSS
251 VKLMGNVW M RLQYVGAYLA PSYSTINTSK VTGEVNFNHL TVGDKNAAQA
301 GIIANKKTNI GTLDLWQSAG LNIIAPPEGG YKDKPNNTPS QSGAKNDKNE
351 SAKNDKQESS QNNSNTQVIN PPNSAQKTEV QPTQVIDGPF AGGKDTVVNI
401 NRINTNADGT IRVGGFKASL TTNA AHLHIG KGGVNL SNQA SGRSLIVENL
451 TGNITVDGPL RVNNQVGGYA LAGSSANFEF KAGTDTKNGT ATFNDISLG
501 RFVNLKVDAH TANFKGIDTG NGGFNTLDFS GVTDKVNINK LITASTNAVAV
551 KNFNINELIV KTNGISVGEY THFSEDIGSQ SRINTVRLET GTRSLFSGGV
601 KFKGGEKLVI DEFYYSPWNY FDARNIKNVE ITNKLAFGPQ GSPWGTSKLM
651 FNNLT LGQNA VMDYSQFLNL TIQGDFINNQ GTINYLV RGG KVATLSVGNA
701 AAMMFNNDID SATGFYKPLI KINSAQDLIK NTEHVLLKAK IIGYGNVSTG
751 TNGISNVNLE EQFKERLALY NNNRMDTCV VRNTDDIKAC GMAIGDQSMV
801 NNP DNYKYLI GKAWKNIGIS KTANGSKISV YYLGNSTPTE NGGNTTNLPT
851 NTT SNARSAN NALAQNAPFA QPSATPNLVA INQHDFGTIE SVFELANRSK
901 DIDTLYANS G AQGRDLLQTL LIDSHDAGYA RKMIDATSAN EITKQLNTAT
951 TTLNNIASLE HKTSGLQTLS LSNAMILNSR LVNLSRRHTN HIDSFAKRLQ
1001 ALKDQKFASL ESAAEVLYQF APKYEKPTNV WANAIGGTSL NNGSNASLYG
1051 TSAGVDAYLN GQVEAIVGGF GSYGYSSFNN RANSLNSGAN NTNFGVYSRI
1101 LTNQHEFD FE AQGALGSDQS SLNFKSALLQ DLNQSYHYLA YSAATRASYG
1151 YDFAFFRNAL VLKPSVGVSY NHLGSTNFKS NSTNQVALKN GSSSQHLFNA
1201 SANVEARYYY GDSYFYMNA GVLQEF AHVG SNNAASLNTF KVNAARNPLN
1251 THARVMMGGE LKLAKEVFLN LGVVYLHNLI SNIGHFASNL GMRYSF

FIG. 2



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FIG. 3



g g g c g a t c g g t t a g c c c i g a a c c c a t t t a t g c t a c g a t t g a t g a t c t c c g g c g a c c t t t c c c t t t g a a a g g c a t g a t a a a g t t g a t g a t c t c a g t a a g g t a

g r s v s [P E P I Y A] t i [D D L] g g p [F P L K R H D K V D D L S K V]

D3

D2

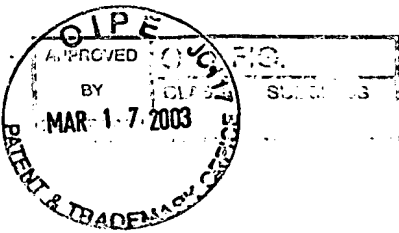
D1



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TCAAAAAGATTCAATTTCTTATTTCTTGTTCTTATTAAGTTCTTTTCATTTTAGCAAATTT
CTTTTTTCAATATTAATAATGATTAATGAAAAAAAAAAAAATGCTTGATATTGTTGTAT
TTGACACTAACAAGATACCGATAGGTATGAACTAGGTATAGTAAGGAGAAACAATGACT
M T
AATAATCTTCAAGTAGCTTTTCTTAAAGTTGATAACGCTGTCGCTTCATACGATCCTGAT
23 N N L Q V A F L K V D N A V A S Y D P D
CAATTAAGGGAAGAATACTCCAATAAAGCGATCAAAAATCCTACCAAAAAGAATCAGTAT
63 Q L R E E Y S N K A I K N P T K K N Q Y
GAATCTTCCACAAAGAGCTTTCAGAAATTTGGGGATCAGCGTTACCGAATTTTCACAAGT
103 E S S T K S F Q K F G D Q R Y R I F T S
GAAAATATCATACAACCCCTATCCTTGATGATAAAGAGAAAGCGGAGTTTTTGAAATCT
143 E N I I Q P P I L D D K E K A E F L K S
ATGGGCGTGTGTTGATGAGTCCTTGAAAGAAAGGCAAGAAGCAGAAAAAATGGAGAGCCT
183 M G V F D E S L K E R Q E A E K N G E P
GATGTCAAAGAAGCAATCAATCAAGAACCAGTTCCCATGTCCAACCAGATATAGCCACT
223 D V K E A I N Q E P V P H V Q P D I A T
AATTTTTCTAAATTCACCTCTTGGCGATATGGAAATGTTAGATGTTGAGGGAGTCGCTGAC
263 N F S K F T L G D M E M L D V E G V A D
TTAATGGGGAGTCATAATGGCATAGAACCTGAAAAAGTTTCATTGTTGTATGGGGGCAAT
303 L M G S H N G I E P E K V S L L Y G G N
AACAAATGTGGCTACAATAATTAATGTGCATATGAAAAACGGCAGTGGCTTAGTCATAGCA
343 N N V A T I I N V H M K N G S G L V I A
GGCTCACAACGAGCATTAAAGTCAAGAAGAGATCCAAAACAAAATAGATTTTCATGGAATTT
383 G S Q R A L S Q E E I Q N K I D F M E F
ACTGAGATTAAAGATTTCCAAAAAGACTCTAAGGCTTATTTAGACGCCCTAGGGAATGAT
423 T E I K D F Q K D S K A Y L D A L G N D
AATGGGGATTTGAGCTACACTCTCAAGATTATGGGAAAAAAGCAGATAAAGCTTTAGAT
463 N G D L S Y T L K D Y G K K A D K A L D
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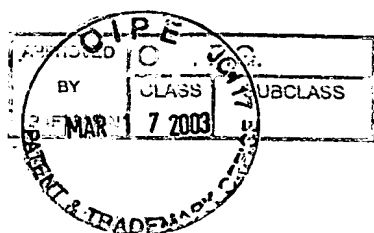
FIG. 4A



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ATCTGTCCTATTGATTTGTTTTCCATTTTGTTCCTCATGTGGATCTTGTGGATCACAAAC 120
CATGTGCTCACCTTGACTAACCATTTCTCCAACCATACTTTAGCGTTGCATTTGATTTCT 240
TTGTTAATTGTGGGTAAAAATGTGAATCGTCCTAGCCTTTAGACGCTGCAACGATCGGG 360
AATGAGAATGTTCAAAGACATGAATTGACTACTCAAGCGTGTAGCGATTTTTAGCAGTCT 480
AACGAAACCATTGACCAACAACCACAAACCGAAGCGGCTTTTAACCCGCAGCAATTTATC 600
N E T I D Q Q P Q T E A A F N P Q Q F I
CAAAAACCAATCGTTGATAAGAACGATAGGGATAACAGGCAAGCTTTTGAAGGAATCTCG 720
Q K P I V D K N D R D N R Q A F E G I S
TTTTCAGACTTTATCAATAAGAGCAATGATTTAATCAACAAAGACAATCTCATTGATGTA 840
F S D F I N K S N D L I N K D N L I D V
TGGGTGTCCCATCAAAACGATCCGTCTAAAATCAACACCCGATCGATCCGAAATTTTATG 960
W V S H Q N D P S K I N T R S I R N F M
GCCAAACAATCTTTTGCAGGAATCATTATAGGGAATCAAATCCGAACGGATCAAAAGTTC 1080
A K Q S F A G I I I G N Q I R T D Q K F
ACTGGTGGGGATTGGTTGGATATTTTTCTCTCATTTATATTTGACAAAAACAATCTTCT 1200
T G G D W L D I F L S F I F D K K Q S S
ACCACCACCGACATACAAGGCTTACCGCCTGAAGCTAGAGATTTACTTGATGAAAGGGGT 1320
T T T D I Q G L P P E A R D L L D E R G
ATTGATCCCAATTACAAGTTCAATCAATTATTGATTCACAATAACGCTCTGTCTTCTGTG 1440
I D P N Y K F N Q L L I H N N A L S S V
GGTGGTCCTGGAGCTAGGCATGATTGGAACGCCACCGTTGGTTATAAAGACCAACAAGGC 1560
G G P G A R H D W N A T V G Y K D Q Q G
GGTGGTGAGAAAGGGATTAACAACCCTAGTTTTTATCTCTACAAAGAAGACCAACTCACA 1680
G G E K G I N N P S F Y L Y K E D Q L T
CTTGACAAAAATAATGCTAAATTAGACAACCTTGAGCGAGAAAGAGAAGGAAAAATTCCGA 1800
L A Q N N A K L D N L S E K E K E K F R
CGTATTGCTTTTGTTCCTAAAAAAGACACAAAACATTCAGCTTTAATTACTGAGTTTGGT 1920
R I A F V S K K D T K H S A L I T E F G
AGGGAGAAAAATGTTACTCTTCAAGGTAGCCTAAACATGATGGCGTGATGTTTGTGAT 2040
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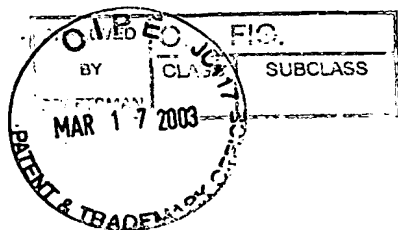
FIG. 4B



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503 Y S N F K Y T N A S K N P N K G V G V T
TTAAATAATCTCGCTATCACTAGTTTCGTAAGGCGGAATTTAGAGGATAAACTAACCCT
543 L N N L A I T S F V R R N L C D K L T T
GAATTGGTTGGAAAACTTTAACTTCAATAAAGCTGTAGCTGACGCTAAAAACACAGGC
583 E L V G K T L N F N K A V A D A K N T G
CATTTAGAGAAAGAAGTAGAGAAAAAATTGGAGAGCAAAAGCGGCAACAAAAATAAAATG
623 H L E K E V E K K L E S K S G N K N K M
GCTAATAGAGACGCAAGAGCAATCGCTTACGCTCAGAATCTTAAAGGCATCAAAAGGGAA
663 A N R D A R A I A Y A Q N L K G I K R E
GAATTCAAAAATGGCAAAAATAAGGATTTTCAGCAAGGCAGAAGAAACACTAAAAGCCCTT
703 E F K N G K N K D F S K A E E T L K A L
AATGCAGCTTTGAATGAATTCAAAAATGGCAAAAATAAGGATTTTCAGCAAGGTAACGCAA
743 N A A L N E F K N G K N K D F S K V T Q
AAAGTTGATAATCTCAATCAAGCGGTATCAGTGGCTAAAGCAACGGGTGATTTTCAGTAGG
783 K V D N L N Q A V S V A K A T G D F S R
CAAAAAAATGAAAGTCTCAATGCTAGAAAAAATCTGAAATATATCAATCCGTTAAGAAT
823 Q K N E S L N A R K K S E I Y Q S V K N
AAAACTTTTCGGACATCAAGAAAGAGTTGAATGCAAACTTGGAATTTCAATAACAAT
863 K N F S D I K K E L N A K L G N F N N N
CAAGCAGCTAGCCTTGAAGAACCCATTTACGCTCAAGTTGCTAAAAAGGTAAATGCAAAA
903 Q A A S L E E P I Y A Q V A K K V N A K
CCTTTGAAAAGGCATGATAAAGTTGATGATCTCAGTAAGGTAGGGCTTTCAAGGAATCAA
943 P L K R H D K V D D L S K V G L S R N Q
TTTGGCAATCTAGAGCAACGATAGACAAGCTCAAAGATTCTACAAAACACAATCCCATG
983 F G N L E Q T I D K L K D S T K H N P M
TACGCTACTAACAGCCACATACGCATTAATAGCAATATCAAAAATGGAGCAATCAATGAA

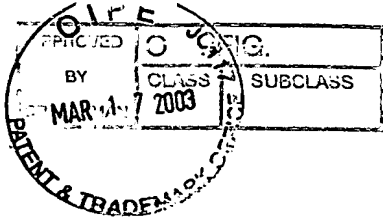
FIG. 4C



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N G V S H L E V G F N K V A I F N L P D
AAAGGATTGTCCCCACAAGAAGCTAATAAGCTTATCAAAGATTTTTTGAGCAGCAACAAA 2280
K G L S P Q E A N K L I K D F L S S N K
AATTATGATGAAGTGAAAAAGCTCAGAAAGATCTTGAAAAATCTCTAAGGAAACGAGAG 2400
N Y D E V K K A Q K D L E K S L R K R E
GAAGCAAAAGCTCAAGCTAACAGCCAAAAAGATGAGATTTTTGCGTTGATCAATAAAGAG 2520
E A K A Q A N S Q K D E I F A L I N K E
TTGTCTGATAAACTTGAAAATGTCAACAAGAATTTGAAAGACTTTGATAAATCTTTTGAT 2640
L S D K L E N V N K N L K D F D K S F D
AAAGGTTTCGGTGAAAGATTTAGGTATCAATCCAGAATGGATTTCAAAGTTGAAAACCTT 2760
K G S V K D L G I N P E W I S K V E N L
GCAAAAAGCGACCTTGAAAATTCCGTTAAAGATGTGATCATCAATCAAAGGTAACGGAT 2880
A K S D L E N S V K D V I I N Q K V T D
GTAGAGCAAGCGTTAGCCGATCTCAAAAATTTCTCAAAGGAGCAATTGGCCCAACAAGCT 3000
V E Q A L A D L K N F S K E Q L A Q Q A
GGTGTGAATGGAACCCTAGTCGGTAATGGGTATCTCAAGCAGAAGCCACAACCTTTTCT 3120
G V N G T L V G N G L S Q A E A T T L S
AACATAATGGACTCAAAAACGAACCCATTTATGCTAAAGTTAATAAAAAGAAAGCAGGG 3240
N N N G L K N E P I Y A K V N K K K A G
ATTGACCGACTCAATCAAATAGCAAGTGGTTTGGGTGTTGTAGGGCAAGCAGCGGGCTTC 3360
I D R L N Q I A S G L G V V G Q A A G F
GAATTGGCTCAGAAAATTGACAATCTCAATCAAGCGGTATCAGAAGCTAAAGCAGGTTTT 3480
E L A Q K I D N L N Q A V S E A K A G F
AATCTATGGGTTGAAAGTGCAAAAAAAGTACCTGCTAGTTTGTGAGCGAAACTAGACAAT 3600
N L W V E S A K K V P A S L S A K L D N
AAAGCGACCGGCATGCTAACGCAAAAAAACCTGAGTGGCTCAAGCTCGTGAATGATAAG 3720

FIG. 4D

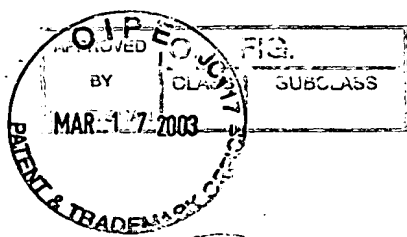


Docket No.: CHIR-0315
App No.: 09/921,157 Filed: August 2, 2001
Title: HELICOBACTER PYLORI CYTOTOXIN PROTEINS
USEFUL FOR VACCINES AND DIAGNOSTICS
Inventors: Covacci, Et Al.
Attorney: Felicity E. Groth
Sheet 10 of 14
Phone: (215) 568-3100

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1023 Y A T N S H I R I N S N I K N G A I N
ATAGTTGCGCATAATGTAGGAAGCGTTCCTTTGTCAGAGTATGATAAAATTGGCTTC
1063 I V A H N V G S V P L S E Y D K I G F
GTAAAAGACACTAATTCTGGCTTTACGCAATTTTAAACCAATGCATTTTCTACAGCA
1103 V K D T N S G F T Q F L T N A F S T A
GGTTTCCAAAAATCTTAAAGGATTAAGGAATACCAAAAACGCAAAAACCACCCCTTG
1143 G F Q K S
TGAATGCTACCAATTCATGGTATCATATCCCCATACATTTCGTATCTAGCGTAGGAAG
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GACAGACACTAACGAAAGGCTTTGTTCTTTAAAGTCTGCATGGATATTTCTACCCC
CGAAAATTAATTAAGGGTTATAAAGAGAGCATAACTAGAAAAAACAAGTAGCTATA
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ATGCCTTTCAAGGTGAAGAGGCAGATATTATTATTATTCCACCGTGAAAACCTTG
ATCTCATTTTTGTGGGTAAAAAGTCTTTCTTTGAGAATTTATGAAGCGATGAGAAGA
CATTCTTCGCTTCAAAACGCTTTTATAAATCTCTCTAAAGCGCTTTATAATCAACAC
TTATTAGCGTTACAATTTGAGCCATTCTTTAGCTTGTTTTTCTAGCCAGATCACATC
CTGCAAATATCCTACAATAGCATCGCCCGAATGGATGAGTAGGGGGGGTGTGAAAG
TAAATAATCACTTCGGGAAAATCTTTAAGGGAGTGAAATAATAACGCATGCAAGTT
TGCGAAACATTCAAATAGCCTTGTTGTTTCAGGGCATTGTCATAAGCGTTGGATTGG
GCTAAAATGCTTGGCTCAATCACGCCACAATAGGGATTTTGAATGCTTTTGCATC
TTGAAAAAATCCAAAGCCTCTAAGCCAAATTGCTTGATCGTAGTGGGGTCTTTAGTG
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FIG. 4E

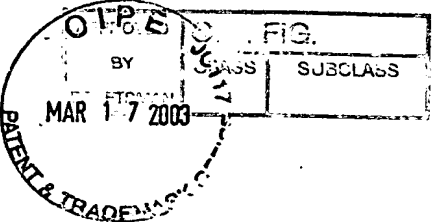


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E K A T G M L T Q K N P E W L K L V N D K
AACCAGAAGAATATGAAAGATTATTCTGATTTCGTTCAAGTTTTCCACCAAGTTGAACAATGCT 3840
N Q K N M K D Y S D S F K F S T K L N N A
TCTTATTACTGCTTGGCGAGAGAAAATGCGGAGCATGGAATCAAGAACGTTAATACAAAAGGT 3960
S Y Y C L A R E N A E H G I K N V N T K G
CTAAAAGCGAGGGGTTTTTAACTCCTTAGCAGAAATCCCAATCGTCTTTAGTATTTGGGA 4080

TGTGCAAAGTTACGCCTTTGGAGATATGATGTGTGAGACCTGTAGGGAATGCGTTGGAGCTCA 4200
GCAACATCAGCCTAGGAAGCCCAATCGTCTTTAGCGGTTGGGCACTTCACCTTAAAATATCCC 4320
AAAAAGACTTAACCCCTTTGCTTAAATTAAGTTTGATTGTGCTAGTGGGTTCTGTGCTATAGTG 4440
ACAAAGATCAAGTTCAAAAAATCATAGAGCTTTTAGAGCAAATTGATCGCGCTCTTAACCAAA 4560
TGCGATCAGAAGTGGA AAAATACGGCTTCAAGAATTTTGATGAGCTCAAAATAGACACTGTGG 4680
GTAATCTTTCTTTCTTGCTAGATTCTAAACGCTTGAATGTGGCTATTTCTAGGGCAAAGAAA 4800
ATATCTTTAGCGCTATTTTGCAAGTCTGTAGATAGGTAATCTTTTCAAAGATAATCATTAGA 4920
AATACCCTTATAGTGTGAGCTATAGCCCCTTTTGGGAATTGAGTTATTTTGACTTTAAATTT 5040
GCCGCTCGCATGAAATTCACCTTTAGGGAATGCGTGTGCATTTTTTTAAGGGCGTATTTTG 5160
GGCAAATGCTCCATAAAATAGCCCTCAATTTTTTGAGCGATTAAGGGAAAATGCGTGCAACC 5280
TCTAACAATTCGCCCTCTAAAATACTTTCTTCAATCAAAGGCACAAAAGAGAAGTGGCTAAA 5400
ATCGTCGCTTTTGTCCCTAGCACTAAAATAGGGGCGTTTTTATCTTTTACTTGTGCTTGATC 5520
TCTTCTAAAGCTAGAGCGCTCGCTGTGTTGCATGCCACAATCAATAATTCAATCTGGTGCGGT 5640
CCATAAGGCACTCTAGCCGTATCGCCATAATAGATGATTTTCATCAAATAATTGCGCTTTTAAA 5760
ACACTTTTTTAATTTAATGGGATTAATTAGGGATTTTATTTTTTCATTCATTAAGTTTAAAAAT 5880

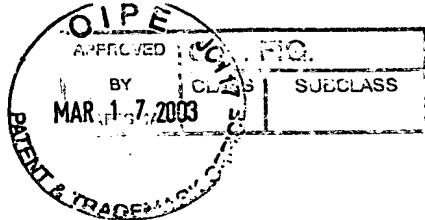
FIG. 4F



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10 30 50
AAGCTTGCTGTCATGATCACAAAAACACTAAAAACATTATTATTAAGGATACAAAATG
M
70 90 110
GCAAAAGAAATCAAATTTTCAGATAGTGCGAGAAACCTTTTATTTGAAGGCGTGAGGCAA
A K E I K F S D S A R N L L F E G V R Q
130 150 170
CTCCATGACGCTGTCAAAGTAACCATGGGGCCAAGAGGCAGGAATGTATTGATCCAAAAA
L H D A V K V T M G P R G R N V L I Q K
190 210 230
AGCTATGGCGCTCCAAGCATCACCAAAGACGGCGTGAGCGTGGCTAAAGAGATTGAATTA
S Y G A P S I T K D G V S V A K E I E L
250 270 290
AGTTGCCAGTAGCTAACATGGGCGCTCAACTCGTTAAAGAAGTAGCGAGCAAAACCGCT
S C P V A N M G A Q L V K E V A S K T A
310 330 350
GATGCTGCCGGCGATGGCAGCACCACAGCGACCGTGCTAGCTTATAGCATTTTTAAAGAA
D A A G D G T T T A T V L A Y S I F K E
370 390 410
GGTTTGAGGAATATCACGGCTGGGGCTAACCTATTGAAGTGAAACGAGGCATGGATAAA
G L R N I T A G A N P I E V K R G M D K
430 450 470
GCTGCTGAAGCGATCATTAAATGAGCTTAAAAAAGCGAGCAAAAAAGTAGGCGGTAAAGAA
A A E A I I N E L K K A S K K V G G K E
490 510 530
GAAATCACCCAAGTGGCGACCATTTCTGCAAACTCCGATCACAATATCGGGAAACTCATC
E I T Q V A T I S A N S D H N I G K L I
550 570 590
GCTGACGCTATGGAAAAAGTGGGTAAAGACGGCGTGATCACCGTTGAGGAAGCTAAGGGC
A D A M E K V G K D G V I T V E E A K G
610 630 650
ATTGAAGATGAATTGGATGTCGTAGAAAGGCATGCAATTTGATAGAGGCTACCTCTCCCCT
I E D E L D V V E G M Q F D R G Y L S P

FIG. 5A

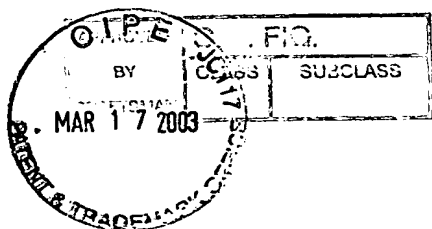


Packet No.: CHIR-0315
App No.: 09/921,157 Filed: August 2, 2001
Title: HELICOBACTER PYLORI CYTOTOXIN PROTEINS
USEFUL FOR VACCINES AND DIAGNOSTICS
Inventors: Covacci, Et Al.
Attorney: Felicity E. Groth
Sheet 13 of 14
Phone: (215) 568-3100

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670 690 710
TATTTTGTAAACGAACGCTGAGAAAATGACCGCTCAATTGGATAATGCTTACATCCTTTTA
Y F V T N A E K M T A Q L D N A Y I L L
730 750 770
ACGGATAAAAAAATCTCTAGCATGAAAGACATTCTCCCGCTACTAGAAAAAACCATGAAA
T D K K I S S M K D I L P L L E K T M K
790 810 HindIII
GAGGGCAAACCGCTTTTAAATCATCGCTGAAGACATTGAGGGCGAAGCTTTAACGACTCTA
E G K P L L I I A E D I E G E A L T T L
850 870 890
GTGGTGAATAAATTAAGAGGCGTGTGTAATATCGCAGCGGTTAAAGCTCCAGGCTTTGGG
V V N K L R G V L N I A A V K A P G F G
910 930 950
GACAGAAGAAAAGAAATGCTCAAAGACATCGCTATTTTAAACCGGCGGTCAAGTCATTAGC
D R R K E M L K D I A I L T G G Q V I S
970 990 1010
GAAGAATTGGGCTTGAGTCTAGAAAACGCTGAAGTGGAGTTTTTAGGCAAAGCTGGAAGG
E E L G L S L E N A E V E F L G K A G R
1030 1050 1070
ATTGTGATTGACAAAGACAACACCACGATCGTAGATGGCAAAGGCCATAGCGATGATGTT
I V I D K D N T T I V D G K G H S D D V
1090 1110 1130
AAAGACAGAGTCGCGCAGATCAAAACCCAAATTGCAAGTACGACAAGCGATTATGACAAA
K D R V A Q I K T Q I A S T T S D Y D K
1150 1170 1190
GAAAAATTGCAAGAAAGATTGGCTAAACTCTCTGGCGGTGTGGCTGTGATTAAAGTGGGC
E K L Q E R L A K L S G G V A V I K V G
1210 1230 1250
GCTGCGAGTGAAGTGGAAATGAAAGAGAAAAAGACCGGGTGGATGACGCGTTGAGCGCG
A A S E V E M K E K K D R V D D A L S A
1270 1290 1310
ACTAAAGCGGCGGTTGAAGAAGGCATTGTGATTGGTGGCGGTGCGGCTCTCATTGCGCG
T K A A V E E G I V I G G G A A L I R A

FIG. 5B



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Attorney: Felicity E. Groth
Sheet 14 of 14
Phone: (215) 568-3100

14/14

1330	1350	1370
GCTCAAAAAGTGCATTTGAATTTGCACGATGATGAAAAAGTGGGCTATGAAATCATCATG		
A Q K V H L N L H D D E K V G Y E I I M		
1390	1410	1430
CGCGCCATTAAAGCCCCATTAGCTCAAATCGCTATCAACGCTGGTTATGATGGCGGTGTG		
R A I K A P L A Q I A I N A G Y D G G V		
1450	1470	1490
GTCGTGAATGAAGTAGAAAAACACGAAGGGCATTTTGGTTTTAACGCTAGCAATGGCAAG		
V V N E V E K H E G H F G F N A S N G K		
1510	1530	1550
TATGTGGATATGTTTAAAGAAGGCATTATTGACCCCTTAAAGTAGAAAGGATCGCTCTA		
Y V D M F K E G I I D P L K V E R I A L		
1570	1590	1610
CAAAATGCGGTTTTCGGTTTCAAGCCTGCTTTTAAACCACAGAAGCCACCGTGCATGAAATC		
Q N A V S V S S L L L T T E A T V H E I		
1630	1650	1670
AAAGAAGAAAAAGCGACTCCGGCAATGCCTGATATGGGTGGCATGGGCGGTATGGGAGGC		
K E E K A T P A M P D M G G M G G M G G		
1690	1710	1730
ATGGGCGGCATGATGTAAGCCCGCTTGCTTTTTAGTATAATCTGCTTTTAAATCCCTTC		
M G G M M *		
1750	1770	1790
TCTAAATCCCCCCTTTCTAAAATCTCTTTTTTGGGGGGTGCTTTGATAAAACCGCTCG		
1810	1830	
CTTGTA AAAACATGCAACAAAAAATCTCTGTTAAGCTT		

FIG. 5C